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IN THE SPECIFICATION:

Page 19, line 16 to Page 20, line 1, please amend as follows:

For applying ~~electric chemical~~ electrochemical treatment such as anodic oxidation to the substrate, the following process is needed: As shown in FIGURE 10, the substrate 2 is immersed in a formation solution 51 in an insulated vessel 50, being held in an upright condition. A direct current potential is then applied to a connection pattern 52 formed on the upper part of the substrate 2 through a connection jig such as clips, with the upper part of the substrate 2 being partly left above the surface of the solution. In FIGURE 10, reference numerals 53, 54, 55 designate a direct current power source, an ammeter and a cathode plate composed of an SUS plate, respectively.

Page 20, line 21 to Page 21, line 13, please amend as follows:

In such circumstances, there have been long awaited the realization of a pinhole test method capable of detecting

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pinholes on scan lines, opposed electrodes and storage capacitance lines without conducting an aging inspection. For accomplishing the above and other objects, there have been strong demands to the development of a compact production system capable of applying ~~electric-chemical~~ electrochemical treatment to a particular region in a substrate, applying ~~electric-chemical~~ electrochemical treatment to a plurality of substrates at the same time, and dealing with larger substrates.

#### DISCLOSURE OF THE INVENTION

The present invention is directed to overcoming the foregoing problems and therefore provides a technique in which a specified chemical solution is applied to the top surface of a horizontally laid substrate; pinholes on an insulating layer are found by ~~electric-chemical~~ electrochemical means; and the pinholes which have been found are filled up with an insulating material different from that of the insulating layer. Concretely, the invention is designed as follows.

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Page 22, lines 1 and 2, please amend as follows:

A third aspect of the invention describes an in-substrate selective ~~electric-chemical~~ electrochemical treatment system comprising:

Page 22, line 22-24, please amend as follows:

With this arrangement, ~~electric-chemical~~ electrochemical treatment such as pinhole inspection can be applied to a certain region on the substrate without use of a special mask material.

Page 23, line 19 to Page 28, line 21, please amend as follows:

A fourth aspect of the invention describes an in-substrate selective ~~electric-chemical~~ electrochemical treatment system in which the reversed polarity electrode plate is smaller than the insulating substrate or slightly larger than the image displaying section of the active substrate formed on the insulating substrate, the system

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having means for confining the chemical solution by surface tension or a seal, to be kept in a gap created by making the reversed polarity electrode plate close to the treatment object, that is, the insulating substrate.

With this arrangement, the ~~electric—chemical~~ electrochemical treatment can be selectively applied to only the region on the substrate where the electrode plate is placed.

A fifth aspect of the invention describes an in-substrate selective ~~electric—chemical~~ electrochemical treatment system in which the reversed polarity electrode plate is a double-purpose reversed polarity electrode plate which (or more particularly, only a sponge (described later) attached thereto) is smaller than the insulating substrate or slightly larger than the image displaying section of the active substrate formed on the insulating substrate; which includes a porous soft material (thin) plate attached thereto such as a sponge whose inner surface facing the insulating substrate is impregnated with the chemical solution; and which is softly pressed against the insulating substrate.

With this arrangement, the ~~electric—chemical~~ electrochemical treatment can be selectively applied to only

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the region on the substrate where the double-purpose reversed polarity electrode plate is softly pressed (or the region where the sponge or the like attached to the reversed polarity electrode plate is pressed).

A sixth aspect of the invention describes an in-substrate selective ~~electric-chemical~~ electrochemical treatment system in which the reversed polarity electrode plate is smaller than the insulating substrate or slightly larger than the image displaying section of the active substrate formed on the insulating substrate.

This treatment system includes a mechanism for pressing a ~~frame-like~~ frame-shaped container disposed on the insulating substrate. The ~~frame-like~~ frame-shaped container has, at the upper and lower ends thereof, an opening slightly larger than the reversed polarity electrode plate (the size of the openings is as large as possible on condition that no problem arises in insertion, attachment and detachment of the reversed polarity electrode plate relative to the ~~frame-like~~ frame-shaped container (e.g., about 0.1 mm to 0.3 mm)). The ~~frame-like~~ frame-shaped container has chemical resistance in the region around the opening at the lower end (the chemical resistant region includes the underside of the ~~frame-like~~

frame-shaped container). A flexible sealing material is embedded into the opening of the ~~frame-like~~ frame-shaped container so as to project downwardly from the ~~frame-like~~ frame-shaped container.

With this arrangement, the chemical solution does not leak from the ~~frame-like~~ frame-shaped container on the substrate and therefore excessive force is not imposed on the substrate. In addition, the ~~electric-chemical~~ electrochemical treatment can be selectively applied to the region where the ~~frame-like~~ frame-shaped container is mounted.

A seventh aspect of the invention describes an in-substrate selective ~~electric-chemical~~ electrochemical treatment system which comprises a chemical solution confining section in the form of a ~~bex-like~~ box-shaped container having a reversed polarity electrode therein. The chemical solution confining section has, at its ends, an opening which is smaller than the insulating substrate or slightly larger than the image displaying section of the active substrate formed on the insulating substrate (these openings do not extend over other members already formed on the substrate), and a flexible sealing material is embedded into the lower open-end of the chemical solution confining section. The in-substrate

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selective ~~electric-chemical~~ electrochemical treatment system further comprises pressing means for pressing the chemical solution confining section against the insulating substrate.

With this arrangement, the ~~electric-chemical~~ electrochemical treatment can be selectively applied to the region where the ~~box-like~~ box-shaped container is mounted on the substrate. In addition, generation of chemical solution mist can be restricted so that the chemical resistance of the ~~electric-chemical~~ electrochemical treatment system can be increased and the consumption of the chemical can be markedly reduced.

A eighth aspect of the invention describes an in-substrate selective ~~electric-chemical~~ electrochemical treatment system which has washing means for washing away a chemical solution remaining on a lower surface, wall surface and others within a chemical solution treatment space by use of a washing fluid such as pure water after completion of the treatment of the insulating substrate within the chemical solution treatment space. The chemical solution treatment space is created by pressing a ~~frame-like~~ frame-shaped container against the insulating substrate. The ~~frame-like~~ frame-shaped container has, at its upper and lower ends, an

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opening slightly larger than the reversed potential electrode plate and has a flexible sealing material embedded in the lower open-end.

With this arrangement, the chemical solution used for the ~~electric chemical~~ electrochemical treatment can be washed away (carried away) by e.g., pure water in every treatment. Therefore, there is no fear of the diffusion of the chemical solution adhered to the insulating substrate, so that the ~~electric chemical~~ electrochemical treatment system can be easily protected from corrosion.

A ninth aspect of the invention describes an in-substrate selective ~~electric chemical~~ electrochemical treatment system in which the temperature of the electrode plate is controlled by flowing temperature-controlled water inside the reversed polarity electrode plate.

This prevents changes in the temperature of the chemical solution due to an ~~electric chemical~~ electrochemical reaction, so that the stability of the reaction speed etc. of the ~~electric chemical~~ electrochemical reaction can be improved.

A tenth aspect of the invention describes an in-substrate selective ~~electric chemical~~ electrochemical treatment system comprising means for circulating the chemical solution and

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means for controlling the temperature of the chemical solution.

By virtue of this arrangement, changes in the temperature of the chemical solution due to an ~~electric-chemical~~ electrochemical reaction can be prevented, increasing the stability of the ~~electric-chemical~~ electrochemical reaction.

A 11th aspect of the invention describes a process for treating a substrate by use of the in-substrate selective ~~electric-chemical~~ electrochemical treatment system described in the third and the fifth aspect of the invention. According to this treatment process, an insulating substrate having a conductive pattern is held on a stage, and an electrode is connected to the conductive pattern at the periphery of the insulating substrate. A specified amount of chemical solution is supplied onto the insulating substrate so as to be confined. The reversed polarity electrode plate is made close to the insulating substrate so that the reversed polarity electrode plate comes in contact with the chemical solution on the insulating substrate. A direct current electric field is applied between the electrode connected to the conductive pattern and the reversed polarity electrode plate. Thus, a

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treatment such as anodic oxidation and pinhole inspection is done.

A 12th aspect of the invention describes a process for treating a substrate by use of the in-substrate selective ~~electric chemical~~ electrochemical treatment system described in the seventh of the invention and others. According to this treatment process, an insulating substrate having a conductive pattern is held on a stage, and a chemical solution is supplied to a ~~frame-like~~ frame-shaped or ~~box-like~~ box shaped container. An electrode is connected to the conductive pattern at the periphery of the insulating substrate. A direct current electric field is applied between the electrode and the reversed polarity electrode plate within the container. Thus, a treatment is done.

Page 34, line 23 to Page 36, line 2, please amend as follows:

A 21st aspect of the invention describes an in-substrate selective chemical treatment system associated with the in-substrate selective chemical treatment system of the 7th aspect of the invention, which comprises a mechanism for

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supplying and discharging a chemical solution, pure water, drying gas or the like to and from a space defined by a ~~bex-like~~ box-shaped container and an insulating substrate.

With this arrangement, chemical treatment can be applied selectively to the region on the substrate where the ~~bex-like~~ box-shaped container is mounted. In addition, occurrence of chemical solution mist can be restricted so that the chemical resistance etc. of the chemical treatment system can be significantly improved.

A 22nd aspect of the invention describes a process for treating a substrate by use of an in-substrate selective chemical treatment system, the process being associated with the repairing process of the 17th aspect of the invention. According to this substrate treatment process, an insulating substrate is held on a stage and a ~~bex-like~~ box-shaped container is pressed against the insulating substrate. Then, a chemical solution is supplied to the ~~bex-like~~ box-shaped container for application of specified chemical treatment. After discharging the chemical solution, pure water or the like is supplied to the ~~bex-like~~ box-shaped container to wash the inside of the ~~bex-like~~ box-shaped container and the insulating substrate. After the pure water has been

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discharged, warm drying gas is supplied to the ~~bex-like~~ box-shaped container to dry the inside of the ~~bex-like~~ box-shaped container and the insulating substrate.

With this arrangement, chemical treatment can be applied selectively to the region on the substrate where the ~~bex-like~~ box-shaped container is mounted. In addition, occurrence of chemical solution mist can be restricted so that the chemical resistance etc. of the equipment can be significantly improved.

Page 36, line 23 to Page 37, line 17, please amend as follows:

FIGURE 11 schematically illustrates the structure of an ~~electric-chemical~~ electrochemical treatment system according to a first embodiment of the invention and a treatment performed by it.

FIGURE 12 schematically illustrates the structure of an ~~electric-chemical~~ electrochemical treatment system according to a second embodiment of the invention and a treatment performed by it.

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FIGURE 13 schematically illustrates a treatment performed by an ~~electric-chemical-~~electrochemical treatment system according to a third embodiment of the invention.

FIGURE 14 schematically illustrates a treatment performed by an ~~electric-chemical-~~electrochemical treatment system according to a fourth embodiment of the invention.

FIGURE 15 shows a sectional view of a scan line within a pinhole after anodic oxidation and a sectional view of a scan line within a pinhole after electrodeposition.

FIGURE 16 is a sectional view of a scan line within a pinhole after electrolytic treatment.

FIGURE 17 schematically illustrates treatments performed by ~~electric-chemical-~~electrochemical treatment systems according to other embodiments of the invention.

Page 39, line 6, please amend as follows:

69: ~~frame-like~~frame-shaped container

Page 39, line 9, please amend as follows:

80: ~~box-like~~box-shaped container

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Page 39, line 23 to Page 40, line 17, please amend as follows:

An active substrate 2 is conveyed from the outside of an in-substrate selective ~~electric-chemical~~ electrochemical treatment system or from a substrate storage container within the treatment system by a conveyor means (not shown) such as a robot arm to be installed and horizontally retained on a stage 60. There is a mechanism for holding the substrate 2 by use of vacuum suction. Then, an electrode plate 61 is made to be close to the active substrate 2 and an electrolytic solution 62 such as nitric acid adjusted for example 0.1 N (normal) is dropped onto a gap between the active substrate 2 and the electrode plate 61. For this purpose, an appropriate area of the electrode plate 61 is provided with a chemical solution injecting port 63. Theoretically, the smaller the gap between the active substrate and the electrode plate is, the smaller the amount of the chemical solution is required. However, the gap is set to 0.1 to 0.5 mm, in consideration of the fact that there are warpage and swell in the order of about 0.05 mm in the active substrate 2. With the gap of such an order, the

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electrolytic solution is trapped within the gap by surface tension so that it does not flow into the region where terminal electrodes 5, 6 are disposed and which is near an image displaying section.

Page 43, line 25 to Page 49, line 16, please amend as follows:

In the second embodiment, the use of the sponge allows the chemical solution to be trapped within the sponge. The chemical solution is replenished upon request only when the chemical solution within the sponge decreases in amount, so that the amount of the chemical solution to be shifted onto the substrate can be reduced. In other words, this embodiment is advantageous in that the amount of the chemical solution to be taken away being adhered to the substrate 2 or the consumption of the chemical solution (i.e., the loss of the chemical solution) can be reduced and in that a voltage as high as 100V or more can be easily applied during the electric ~~chemical~~ electrochemical treatment, by letting the sponge have a thickness of several mm or more.

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It is possible to use a stereotyped, general-purpose electrode plate, while only the sponge needs to be designed to have the same shape and size as those of the inspection region of the active substrate.

Further, a plurality of sponges may be adhered to the electrode plate.

(Third Embodiment)

A third embodiment uses a ~~frame-like~~ frame-shaped container.

Reference is made to FIGURE 13 for describing the third embodiment of the invention.

First, the active substrate 2 is placed on the stage 60 to be held horizontally there on. Then, a ~~frame-like~~ frame-shaped container 69 is pressed against the active substrate 2, the ~~frame-like~~ frame-shaped container 69 having an opening slightly larger than the electrode plate 61 at its upper and lower ends and a sealing material 68 embedded at its lower end. Then, the electrode plate 61 is inserted into the ~~frame-like~~ frame-shaped container 69 and held in a stationary condition at a position several mm or more apart from the active substrate 2. Subsequently, an appropriate electrolytic solution 62 such as nitric acid 0.1 N is dropped into the

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~~frame-like~~ frame-shaped container 69. Note that reference numeral 64 designates a supporting bar for holding, lifting and lowering the electrode plate 61. A mechanism for holding, lifting and lowering the ~~frame-like~~ frame-shaped container 69 is simple and unrelated to the object of the invention and therefore an explanation of the mechanism is omitted in the drawings.

A minus potential is applied from a direct current power source to the terminal 65 in the periphery of the active substrate 2, and a plus potential is applied from the direct current power source to the electrode plate 61, while the value of a current flowing between the terminal 65 and the electrode plate 61 is measured. Although not shown in the drawings, the electrolytic solution 62 is exhausted from the ~~frame-like~~ frame-shaped container 69 with a proper means after completion of the pinhole inspection and then, pure water is introduced into the ~~frame-like~~ frame-shaped container 69 and discharged therefrom thereby removing the electrolytic solution 62. Thereafter, the substrate 2 is preferably dried with a proper means and then, the electrode plate 61 and the ~~frame-like~~ frame-shaped container 69 are moved away from the

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substrate 2. Subsequently, the substrate 2 is separated from the stage 60 to be taken out of the chemical treatment system.

In the third embodiment, use of the ~~frame-like~~ frame-shaped container 69 allows the electrolytic solution 62 to be trapped within the ~~frame-like~~ frame-shaped container 69. Therefore, the electrolytic solution can be recovered and removed without dispersion and scatter on the substrate. In addition, since the electrode plate can be moved far away from the active substrate, a voltage as high as 100V or more can be easily applied during the ~~electric-chemical~~ electrochemical treatment.

(Fourth Embodiment)

A fourth embodiment utilizes a ~~box-like~~ box-shaped container.

In the present embodiment, a specialized treatment container is used for the purpose of preventing diffusion and scatter of the chemical solution itself. A ~~box-like~~ box-shaped container 80 used in the present embodiment is the same as the container of the forgoing third embodiment except use of a lid. Specifically, the container 80 uses a flexible sealing material 68 embedded in its open end.

With reference to FIGURE 14, the fourth embodiment will be described below.

First, the active substrate 2 is placed and horizontally held on the stage 60 as shown in FIGURES 14(1) and 14(2). Then, as shown in FIGURE 14(2), the ~~bex-like~~ box-shaped container 80 is pressed against the active substrate 2. The ~~bex-like~~ box-shaped container 80 has (i) the electrode plate 61 mounted therein, (ii) an opening slightly larger than the image displaying section and defined at the lower end of the electrode plate 61, and (iii) the flexible sealing material 68 embedded at the lower end. Then, the proper electrolytic solution 62 such as nitric acid 0.1 N is supplied to the ~~bex-like~~ box-shaped container 80 through a chemical solution supply port 81 while being recovered from a chemical solution discharge port 82, thereby carrying out a circulative supply. Note that the electrode plate 61 is fixedly placed within the ~~bex-like~~ box-shaped container 69. A minus potential is applied from a direct current power source to the terminal (not shown) and a plus potential is applied from the direct current power source to the electrode plate 61, whereby an ~~electric-chemical~~ electrochemical treatment is done. After completion of the ~~electric-chemical~~ electrochemical treatment,

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discharge of the electrolytic solution, washing-away of the electrolytic solution with pure water, and drying of the inside of the ~~bex-like~~ box-shaped container 80 as well as the substrate by spraying drying gas are carried out. Then, the ~~bex-like~~ box-shaped container 80 is separated from the substrate 2 and subsequently, the substrate 2 is separated from the stage 60 to be taken out of the ~~electric-chemical~~ electrochemical treatment system.

As shown in FIGURE 14(1), a piping system for circulating the electrolytic solution 62 is formed as a closed circuit by connecting a supply pipe 83, the ~~bex-like~~ box-shaped container 80 and an electrolytic solution recovery pipe 82, the supply pipe 83 having an electrolytic solution supply tank 85 and an electrolytic solution supply pump 86. Reference numeral 87 represents a filter for removing particles and impurities contained in the electrolytic solution, whereas reference numeral 88 represents a temperature controlling system such as a cooler for controlling the temperature of the circulating electrolytic solution 62. In addition, pure water supplied from a pure water supply port 101 and an inactive gas such as nitrogen gas supplied from a drying gas supply port 102 are sent to the ~~bex-like~~ box-shaped container 80 by switching

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selector valves 91, 92. Similarly, the electrolytic solution 62 recovered from the chemical solution recovery port 82, treating water discharged after washing the inside of the ~~bex-like~~ box-shaped container 69, and a treating gas which has been used for drying the inside of the ~~bex-like~~ box-shaped container 69 are sent to either the chemical solution circulating tank 85 or a drain (and exhaust) port 103, by operation of selector valves 93, 94 in combination.

According to the fourth embodiment, there is absolutely no fear of generation of the electrolytic solution and electrolytic solution mist around the substrate 2, so that the ~~electric chemical~~ electrochemical treatment system of this embodiment assures extremely high safety. When conducting a pinhole inspection on the scan lines 11 (and the opposed electrodes and/or the common capacitance lines 40), a rise in the temperature of the electrolytic solution 62 due to leakage current is insignificant and therefore the circulation of the electrolytic solution 62 is unnecessary. In this case, it is preferable to stop the circulation pump 86 because the noise of the leakage current can be reduced and, in consequence, a desirable result can be achieved.

(Fifth Embodiment)

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The fifth embodiment relates to repair of a matrix substrate by use of the ~~electric-chemical~~ electrochemical treatment system described above, in cases where a pinhole is present in the insulating layer on the scan lines (and the opposed electrodes and/or the storage capacitance lines).

As explained in the fabrication process of the active substrate 2, various metallic materials can be used for the scan lines. In cases where a scan line material such as Ta, Al and their silicides, which forms an insulating layer by anodic oxidation, is used, the ~~electric-chemical~~ electrochemical treatment system described earlier in the explanation of the embodiments is employed; a formation solution such as oxalic acid and ethylene glycol is selected as the chemical solution; and a plus potential is applied to the scan lines 11 while a minus potential is applied to the electrode plate 61 made from high-purity SUS or SUS plate 61 coated with precious metal, whereby the scan line 11 within the pin hole 44 is anodized, forming a Ta or Al anodized layer 70 to fill part of the pinhole 44 as shown in FIGURE 15(1). In this case, formation voltage is 100 to 200 volts and the thickness of the anodized layer 70 is 0.2 to 0.5  $\mu\text{m}$  so that sufficient withstand voltage can be ensured.

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Page 50, line 15 to Page 55, line 3, please amend as follows:

The seventh embodiment relates to a technique of discontinuing the scan line in a pinhole area. In cases where a scan line material such as Cr, Mo and Ti that enables electrolytic treatment by a chemical solution is used in contrast with the foregoing two embodiments, the electric ~~chemical~~ electrochemical treatment system of the invention is used; an electrolytic solution such as nitric acid or hydrochloric acid about 0.1 N is used as the chemical solution 62; and a plus potential is applied to the scan lines 11 while a minus potential being applied to the electrode plate 61 composed of a SUS plate, whereby a scan line in the pinhole 44 is dissolved into the electrolytic solution 62 in the form of positive Cr, Mo and Ti ions, so that Cr, Mo and Ti thin films are precipitated on the surface of the electrode plate 61. The electrolytic treatment is continued for an appropriate period of time, namely, several minutes to ten-odd minutes to dissolve the scan line 11 within the pinhole 44 by about several  $\mu\text{m}$ , thereby forming a chipped portion 71 as shown in

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FIGURE 16. Although it depends on the pattern width of the scan line 11, the scan line 11 in the region where a pinhole is present may be removed in the form of the pinhole for line discontinuation. In this case, as far as a redundancy arrangement or remedy circuit is provided, the active substrate can be easily restored to its sound condition.

Usually, 10 to 50V is enough for bath voltage. By virtue of the elimination of the scan line 11 within the pinhole 44, even if the liquid crystal penetrating through the pinhole electrically reacts with the remaining scan lines 11, it takes a time for the ions generated by the ~~electric-chemical~~ electrochemical reaction to pass through the narrow space having a height of 0.3  $\mu\text{m}$  (which corresponds to the thickness of the scan line 11) at the highest. As a result, appearance of abnormalities in displayed images can be delayed. This leads to improved reliability.

(Eighth Embodiment)

The eighth embodiment relates to cooling of the system.

In the above-described method for repairing a matrix substrate in which a pinhole is present in the insulating layer on the scan lines (and the opposed electrodes and/or the storage capacitance lines), a rise in the temperature of the

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chemical solution by formation current or bath current is insignificant like the case of the inspection method for checking the presence/absence of a pinhole on the insulating layer on the scan lines (and on the opposed electrode or the storage capacitance lines), and therefore circulation of the electrolytic solution is unnecessary.

However, the temperature of the chemical solution sometimes rises significantly during ~~electric-chemical~~ electrochemical treatment by use of the in-substrate selective ~~electric-chemical~~ electrochemical treatment system. For instance, when anodizing the scan lines made of an aluminum alloy in the process of fabricating four 15-type XGA panels on a 550 × 600 mm glass substrate, a formation current of 1 to 2A flows for several minutes with a formation voltage of 100 to 150V in the case of constant voltage formation and therefore the temperature rise of the electrolytic solution is inevitable. The temperature rise of the electrolytic solution should be avoided by a proper means. If the amount of the confined electrolytic solution is small, temperature-controlled water may be allowed to flow inside the electrode plate to control the temperature of the electrode plate.

On the other hand, if the amount of the confined electrolytic solution is large, it is rational to control the temperature of the electrolytic solution by circulating it.

The in-substrate selective chemical treatment system of the present embodiment is obtained by expanding the concept of the above-described in-substrate selective ~~electric-chemical~~ electrochemical treatment system and comprises, as shown in ~~FIGUER~~-FIGURE 14, (i) the stage 60 for holding the insulating substrate; (ii) the mechanism for pressing the ~~bex-like~~ box-shaped container 80 against a region smaller than the insulating substrate 2 or slightly larger than the active substrate formed on the insulating substrate, the ~~bex-like~~ box-shaped container 80 having the flexible sealing material 68 embedded in an open end that is smaller than the above region; and (iii) the mechanism for supplying and discharging a chemical solution, pure water or drying gas into or from the ~~bex-like~~ box-shaped container 80.

The system of the eighth embodiment differs from the above-described in-substrate selective ~~electric-chemical~~ electrochemical treatment system in the following three points: First, the eighth embodiment does not need a direct current power source nor an electrode plate; second, the

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eightth embodiment does not need a means nor mechanism for electrically connecting a direct current power source to the scan lines and electrode lines such as signal lines; and lastly, the size of the opening of the ~~bex-like~~ box-shaped container is smaller than the insulating substrate or slightly larger than the active substrate formed on the insulating substrate. The treatment process for chemically treating the active substrate by use of such an in-substrate selective ~~electric-chemical~~ electrochemical treatment system is as follows.

First, the insulating substrate 2 is held on the stage 60 and the ~~bex-like~~ box-shaped container 80 is pressed against the insulating substrate 2. While the chemical solution 62 being supplied into the ~~bex-like~~ box-shaped container 80 through the chemical solution supply port 81, the chemical solution 62 is recovered through the chemical solution recovery port 82 thereby circulating the chemical solution 62 to carry out a chemical treatment for a specified period of time. After the supply of the chemical solution 62 has been stopped and the chemical solution 62 has been discharged through a discharge hole (not shown) defined in the lower part of the ~~bex-like~~ box-shaped container 80 utilizing pressure

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(and nitrogen gas), pure water is supplied to the inside of the ~~bex-like~~ box-shaped container 80 to wash the ~~bex-like~~ box-shaped container 80 as well as the insulating substrate 2. After discharging the washing water from the ~~bex-like~~ box-shaped container 80 by use of nitrogen gas, warm nitrogen gas is introduced into the ~~bex-like~~ box-shaped container 80 to dry the ~~bex-like~~ box-shaped container 80 and the insulating substrate 2. After completion of the chemical treatment on the insulating substrate 2, the supply of the dry gas is stopped, the ~~bex-like~~ box-shaped container 80 is moved away from the insulating substrate 2, and the insulating substrate 2 is separated from the stage 60 to be stored in the substrate storage within the chemical treatment system or taken out of the chemical treatment system. Apart from the method of purging the chemical solution and the washing water from the ~~bex-like~~ box-shaped container 80 by use of nitrogen gas, there is an alternative method for recovering the chemical solution and the washing water after completion of the chemical treatment, according to which the stage 60 is inclined to allow the chemical solution or the washing water to flow from the inside of the ~~bex-like~~ box-shaped container 80 into the recovery port 82. This alternative method is suitably applied

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particularly to the case of one side packaging and where this method is applied, it apparently becomes necessary to arrange the mechanism for pressing the ~~bex-like~~ box-shaped container 80 in compliance with the method.

Page 56, line 23 to Page 58, line 9, please amend as follows:

(4) Strictly speaking, the ~~bex-like~~ box-shaped container has not a ~~bex-like~~ box-shaped shape nor rectangular parallelepiped shape, but may be pointed at its top.

#### INDUSTRIAL APPLICABILITY

It will be understood from the foregoing description that according to the in-substrate selective ~~electric-chemical~~ electrochemical treatment system of the invention, ~~electric-chemical~~ electrochemical treatment can be selectively applied to certain regions on a substrate without entirely immersing the substrate into a chemical solution. Therefore, the ~~electric-chemical~~ electrochemical treatment system may be of the compact type that simultaneously deals with a plurality of substrates. Such a type does not involve a large substrate

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which leads to excessive burdens in terms of the design and maintenance of a clean room. In addition, generation of chemical solution mist and vapor can be thoroughly prevented.

Further, unlike the conventional chemical treatment systems, the chemical treatment system of the invention does not require exhausting so that the lifetime of the treatment system can be highly improved, resulting in obviation of the need for maintenance cost. Further, it is favorable in view of safety.

In addition, the ~~electric-chemical~~ electrochemical treatment system of the invention can detect, on an active substrate basis, the presence or absence of a pinhole on the insulating layer on the scan lines (and the storage capacitance lines and/or the opposed electrodes) formed on the active substrate. Therefore, spot-like stains attributable to pinholes, which could not be detected previously unless a long-time aging test was conducted on the substrate assembled into a liquid crystal panel, can be found at an early stage, so that not only the cost of loss can be markedly reduced but also equipment cost and maintenance cost incurred by an aging test can be saved.

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Furthermore, in cases where the scan line within a pinhole on the insulating layer formed on the active substrate is inactivated using the ~~electric-chemical~~ electrochemical treatment system of the invention, there is no possibility of generation of spot-like stains attributable to pinholes and in consequence, improvements in the yield and quality of the products can be achieved.